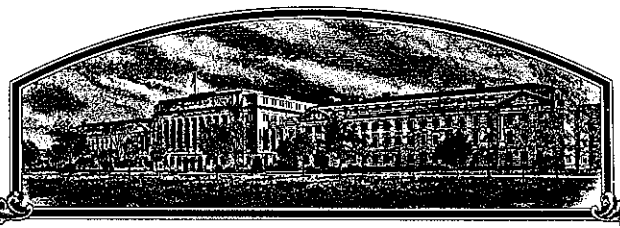

No. 8700033

# THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

## Nickerson American Plant Breeders, Inc.

Whereas, THERE HAS BEEN PRESENTED TO THE

**Secretary of Agriculture**

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF eighteen YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. THE UNITED STATES SEED OF THIS VARIETY (1) SHALL BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS SPECIFIED BY THE OWNER OF THE RIGHTS. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

WHEAT

'Twain'

In Testimony Whereof, *I have hereunto set my hand and caused the seal of the* Plant Variety Protection Office *to be affixed at the City of* Washington, D. C. *this* 31st *day of* August *in the year of our Lord one thousand nine hundred and* eighty-eight.

*Attest:*

Kenneth A. Evans

*Commissioner*
*Plant Variety Protection Office*
*Agricultural Marketing Service*

Richard E. Lyng

*Secretary of Agriculture*

APPROVAL EXPIRES 4-30-88

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

FORM APPROVED: OMB NO. 0581-0055

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

# APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

*(Instructions on reverse)*

1. NAME OF APPLICANT(S)
Nickerson American Plant Breeders Inc.

2. TEMPORARY DESIGNATION
SW78-044-111 or SW78-111

3. VARIETY NAME
Twain

4. ADDRESS *(Street and No. or R.F.D. No., City, State, and Zip Code)*
5201 Johnson Drive
Mission, KS 66205

5. PHONE *(Include area code)*
(913) 384-4940 KS
(303) 532-3721 CO

FOR OFFICIAL USE ONLY

PVPO NUMBER
8700033

6. GENUS AND SPECIES NAME
Triticum aestivum

7. FAMILY NAME *(Botanical)*
Gramineae

FILING
DATE: December 19, 1986
TIME: 10^00 [X] A.M. [ ] P.M.

8. KIND NAME
Soft Red Winter Wheat

9. DATE OF DETERMINATION
1=1982
2=1985

FEES RECEIVED
AMOUNT FOR FILING: $ 1800^00
DATE: November 24, 1986
AMOUNT FOR CERTIFICATE: $ 200.00
DATE: July 26 1988

10. IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION *(Corporation, partnership, association, etc.)*
Corporation

11. IF INCORPORATED, GIVE STATE OF INCORPORATION
Delaware

12. DATE OF INCORPORATION
January 19, 1983

13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS

R.E. Heiner
5201 Johnson Drive
Mission, KS 66201
(913) 384-4940

OR

R.F. Bruns or C. Bruns
P.O. Box 30
Berthoud, CO
PHONE *(Include area code)*: (303) 532-3721

14. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED

a. [X] Exhibit A. Origin and Breeding History of the Variety *(See Section 52 of the Plant Variety Protection Act.)*
b. [X] Exhibit B. Novelty Statement.
c. [X] Exhibit C. Objective Description of Variety *(Request form from Plant Variety Protection Office.)*
d. [X] Exhibit D. Additional Description of Variety.
e. [X] Exhibit E. Statement of the Basis of Applicant's Ownership. Exhibit F. Quality and Statistical Data

15. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? *(See Section 83(a) of the Plant Variety Protection Act.)*
[X] Yes *(If "Yes," answer items 16 and 17 below)* [ ] No

16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS?
[X] Yes [ ] No

17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED?
[X] Foundation [X] Registered [X] Certified

18. DID THE APPLICANT(S) PREVIOUSLY FILE FOR PROTECTION OF THE VARIETY IN THE U.S.?
[ ] Yes *(If "Yes," give date)*
[X] No

19. HAS THE VARIETY BEEN RELEASED, OFFERED FOR SALE, OR MARKETED IN THE U.S. OR OTHER COUNTRIES?
[ ] Yes *(If "Yes," give names of countries and dates)*
[X] No

20. The applicant(s) declares that a viable sample of basic seeds of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.

The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in Section 41, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act.

Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF APPLICANT: Robert E Heiner — DATE: 17 NOV 1986

SIGNATURE OF APPLICANT — DATE



FORM WA-470 (7-84) (Edition of 3-84 is obsolete.)

8700033

# EXHIBIT A.

## ORIGIN AND BREEDING HISTORY OF TWAIN

**PARENTAGE:** Knox 62/SRW 14-74

**DATE OF THE CROSS:** Fall, 1977

**BREEDING HISTORY:**

The cross between Knox 62 and SRW14-74 was made in the 1977 fall greenhouse. The F1 was grown out in the 1978 spring greenhouse. F2 selections were made in the field in the spring of 1979. These selections were advanced by Single Seed Descent through the F3 and F4 generations in the greenhouse in 1980. Single F5 headrows were grown in 1981 and selections were made. From the 1982 preliminary yield trials (Yield I) a line was identified which became SW78-44-111. In 1982, this line was tested in intermediate yield trials (Yield II). It has been tested in advanced yield trials (Yield III) in 1983, 1984, 1985, 1986, and in the Uniform Eastern Soft Red Winter Wheat Nursery in 1985 and 1986. The experimental number used in the Uniform trials was SW78-111. 96 headrows were planted in 1985 and 89 of these were selected at Berthoud, CO to produce Breeders Seed. Approximately 86,500 pounds of Foundation and Registered Seed were produced in 1986.

Twain is uniform and stable. Less than 1% of the plants were rogued from the Foundation and Registered fields in 1986. Ninety-eight percent of these rogued plants were approximately 23 centimeters taller (white chaffed) than Twain, 1% were bronze-chaffed, and 1% were awned. Less than 1% of these off-type plants may be encountered in subsequent generations.

# EXHIBIT B

## NOVELTY STATEMENT

Twain is most similar to the soft red winter wheat Caldwell, however it can be easily distinguished by the following morphological characteristics:

- Twain has a square to oblique shoulder shape. Caldwell has a rounded shoulder shape. (Crop Science; registration no. 660).
- Twain has auricle hairs. Caldwell does not have auricle hairs.
- Twain has an apically awnletted head. Caldwell has an awnletted head.

'Twain'

FORM APPROVED: OMB NO. 0581-0055

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
LIVESTOCK, MEAT, GRAIN & SEED DIVISION
BELTSVILLE, MARYLAND 20705

EXHIBIT C
*(Wheat)*

# OBJECTIVE DESCRIPTION OF VARIETY
## WHEAT (*TRITICUM SPP.*)

**INSTRUCTIONS:** *See Reverse.*

NAME OF APPLICANT(S)

Nickerson American Plant Breeders Inc.

ADDRESS *(Street and No. or R.F.D. No., City, State, and ZIP Code)*

5201 Johnson Drive
Mission, KS 66205

**FOR OFFICIAL USE ONLY**

PVPO NUMBER 8700033

VARIETY NAME OR TEMPORARY DESIGNATION

Place the appropriate number that describes the varietal character of this variety in the boxes below.
Place a zero in first box (e.g. [0][8][9] or [0][9]) when number is either 99 or less or 9 or less.

**1. KIND:**

[1] 1 = COMMON 2 = DURUM 3 = EMMER 4 = SPELT 5 = POLISH 6 = POULARD 7 = CLUB

**2. TYPE:**

[2] 1 = SPRING 2 = WINTER 3 = OTHER *(Specify)* _____

[1] 1 = SOFT 2 = HARD 3 = OTHER *(Specify)* _____

[2] 1 = WHITE 2 = RED 3 = OTHER *(Specify)* _____

**3. SEASON - NUMBER OF DAYS FROM [redacted] TO:**

[1][5][0] FIRST FLOWERING January 1st/

[---] LAST FLOWERING

**4. MATURITY** *(50% Flowering)*:

[0][2] NO. OF DAYS *EARLIER* THAN .....

[7] 1 = ARTHUR 2 = SCOUT 3 = CHRIS 4 = LEMHI 5 = NUGAINES 6 = LEEDS 7=Caldwell

[---] NO. OF DAYS *LATER* THAN .....

[--] 1 = ARTHUR 2 = SCOUT 3 = CHRIS 4 = LEMHI 5 = NUGAINES 6 = LEEDS 7=Caldwell

**5. PLANT HEIGHT** *(From soil level to top of head)*:

[1][0][0] CM. HIGH

[0][7] CM. TALLER THAN .....

[7] 1 = ARTHUR 2 = SCOUT 3 = CHRIS 4 = LEMHI 5 = NUGAINES 6 = LEEDS 7=Caldwell

[---] CM. SHORTER THAN .....

[--]

**6. PLANT COLOR AT BOOTING** *(See reverse)*:

[2] 1 = YELLOW GREEN 2 = GREEN 3 = BLUE GREEN dark

**7. ANTHER COLOR:**

[1] 1 = YELLOW 2 = PURPLE

**8. STEM:**

[1] Anthocyanin: 1 = ABSENT 2 = PRESENT

[2] Waxy bloom: 1 = ABSENT 2 = PRESENT

[2] Hairiness of last internode of rachis: 1 = ABSENT 2 = PRESENT

[1] Internodes: 1 = HOLLOW 2 = SOLID

[0][4] NO. OF NODES *(Originating from node above ground)*

[2][2] CM. INTERNODE LENGTH BETWEEN FLAG LEAF AND LEAF BELOW

**9. AURICLES:**

[2] Anthocyanin: 1 = ABSENT 2 = PRESENT

[2] Hairiness: 1 = ABSENT 2 = PRESENT

**10. LEAF:**

[1] Flag leaf at booting stage: 1 = ERECT 2 = RECURVED 3 = OTHER *(Specify)*: _____

[2] Flag leaf: 1 = NOT TWISTED 2 = TWISTED

[1] Hairs of first leaf sheath: 1 = ABSENT 2 = PRESENT

[2] Waxy bloom of flag leaf sheath: 1 = ABSENT 2 = PRESENT

[1][6] MM. LEAF WIDTH *(First leaf below flag leaf)*

[2][5] CM. LEAF LENGTH *(First leaf below flag leaf)*:

FORM GR-470-4 (REVERSE) 'Twain' 8700033

11. HEAD:

[3] Density: 1 = LAX 2 = DENSE 3=Middense

[1-2] Shape: 1 = TAPERING 2 = STRAP 3 = CLAVATE 4 = OTHER (Specify) tapering to strap

[2] Awnedness: 1 = AWNLESS 2 = APICALLY AWNLETED 3 = AWNLETED 4 = AWNED

[1] Color at maturity: 1 = WHITE 2 = YELLOW 3 = PINK 4 = RED 5 = BROWN 6 = BLACK 7 = OTHER (Specify): _____

[8.8] CM. LENGTH [14] MM. WIDTH

12. GLUMES AT MATURITY:

[3] Length: 1 = SHORT (CA. 7 mm.) 2 = MEDIUM (CA. 8 mm.) 3 = LONG (CA. 9 mm.) ave. 8.6mm

[3] Width: 1 = NARROW (CA. 3 mm.) 2 = MEDIUM (CA. 3.5 mm.) 3 = WIDE (CA. 4 mm.) ave. 3.9mm

[2-4] Shoulder shape: 1 = WANTING 2 = OBLIQUE 3 = ROUNDED 4 = SQUARE 5 = ELEVATED 6 = APICULATE square to oblique

[1] Beak: 1 = OBTUSE 2 = ACUTE 3 = ACUMINATE

13. COLEOPTILE COLOR:

[1] 1 = WHITE 2 = RED 3 = PURPLE

14. SEEDLING ANTHOCYANIN:

[2] 1 = ABSENT 2 = PRESENT

15. JUVENILE PLANT GROWTH HABIT:

[3-2] 1 = PROSTRATE 2 = SEMI-ERECT 3 = ERECT

16. SEED:

[1-3] Shape: 1 = OVATE 2 = OVAL 3 = ELLIPTICAL

[1] Cheek: 1 = ROUNDED 2 = ANGULAR

[2] Brush: 1 = SHORT 2 = MEDIUM 3 = LONG midlong

[2] Brush: 1 = NOT COLLARED 2 = COLLARED approx.4% collared seeds

[--] Phenol reaction (See instructions): 1 = IVORY 2 = FAWN 3 = LT. BROWN 4 = BROWN 5 = BLACK

[3] Color: 1 = WHITE 2 = AMBER 3 = RED 4 = PURPLE 5 = OTHER (Specify) _____

[6.4] MM. LENGTH [3.5] MM. WIDTH [35] GM. PER 1000 SEEDS

17. SEED CREASE:

[1] Width: 1 = 60% OR LESS OF KERNEL 'WINOKA' 2 = 80% OR LESS OF KERNEL 'CHRIS' 3 = NEARLY AS WIDE AS KERNEL 'LEMHI'

[1] Depth: 1 = 20% OR LESS OF KERNEL 'SCOUT' 2 = 35% OR LESS OF KERNEL 'CHRIS' 3 = 50% OR LESS OF KERNEL 'LEMHI'

18. DISEASE: 0 = Not Tested, 1 = Susceptible, 2 = Resistant) 3=Moderately Susceptible 4=Moderately Resistant

[4] STEM RUST contains gene SR5 and SR24.

[2] LEAF RUST (Races) field

[0] STRIPE RUST (Races) _____

[0] LOOSE SMUT

[2] POWDERY MILDEW

[0] BUNT

[4] OTHER (Specify) BYDV, & Rhizoctonia

19. INSECT: 0 = Not Tested, 1 = Susceptible, 2 = Resistant) 3=Moderately Susceptible 4=Moderately Resistant

[0] SAWFLY

[0] APHID (Byav.)

[0] GREEN BUG

[0] CEREAL LEAF BEETLE

[0] OTHER (Specify) _____

HESSIAN FLY RACES: [0] GP [0] A [0] B [0] C [1] D [1] E [0] F [0] G

20. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED.

| CHARACTER | NAME OF VARIETY | CHARACTER | NAME OF VARIETY |
|---|---|---|---|
| Plant tillering | Caldwell | Seed size | Caldwell |
| Leaf size | Caldwell | Seed shape | Caldwell |
| Leaf color | Caldwell | Coleoptile elongation | Caldwell |
| Leaf texture | Caldwell | Seedling pigmentation | Caldwell |

## INSTRUCTIONS

GENERAL: The following publications may be used as a reference aid for the standardization of terms and procedures for completing this form:

(a) L.T. Briggle and L. P. Reitz, 1963, Classification of Triticum Species and Wheat Varieties Grown in the United States, Technical Bulletin 1278, United States Department of Agriculture.

(b) W.E. Wells, 1965, A Standardized Phenol Method for Testing Wheat Seeds for Varietal Purity, contribution No. 28 to the handbook of seed testing prepared by the Association of Official Seed Analysts. (See attachment.)

LEAF COLOR: Nickerson's or any recognized color fan should be used to determine the leaf color of the described variety.

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# EXHIBIT D.

## ADDITIONAL DESCRIPTION OF TWAIN

Twain is a soft red winter wheat bred and developed by Nickerson American Plant Breeders Inc. It is high yielding, early, strong strawed variety with good milling and baking quality.

Twain provides excellent protection to leaf rust, stem rust, powdery mildew, barley yellow dwarf virus, soil borne mosiac virus. It provides very good protection to septoria leaf blotch, wheat spindle streak mosaic virus, take-all and Rhizoctonia. Also, Twain provides good protection to tan spot, but has no protection against Hessian fly.

Twain is an intermediate height (100 cm's) variety. Juvenile plant growth habit is erect to semi-erect. Plant color at boot is a dark green with an erect, twisted flag leaf. Auricles are hairy and do express anthocyanin in some environments. Waxy bloom is present on stem and flag leaf sheath. It has four solid nodes and the internodes are hollow. Spike is apically awnletted and tapering to strap, glumes are glabrous with obtuse beaks and oblique to square shoulders. Heads are white at plant maturity. Kernels are ovate to elliptical with a medium size embryo and round cheeks. Seed crease widths are narrow and depth is shallow. Brush is mid-sized with mid-long hairs.

Twain has performed extremely well in the central, eastern and mid-south areas of the soft wheat region. Early maturity coupled with high yield and excellent disease protection makes this variety widely adapted and useful to the producers of wheat in those regions.

# EXHIBIT E

## STATEMENT OF THE BASIS OF APPLICANT'S OWNERSHIP

Nickerson American Plant Breeders Inc. is the applicant for protection in this case being:

a) The incorporated business (registered in Delaware) for and within which regular employees have bred the named variety.

b) The proprietory owner and intending commercial user of the variety.

# EXHIBIT F

## QUALITY AND STATISTICAL DATA

## TWAIN

AGRIPRO WHEAT
SOFT RED WINTER WHEAT QUALITY

YEAR: 1994 — OVERLOCATION YIII'S — 

| LAB NO. | VARIETY OR LINE | LOC-CODE | MILLING | | | | | | | | BAKING | | | | | SCORES | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | TEST WT | | WH PROT | | BRK FLR | | TOT FLR | | FL PROT | | C. Diam | | T.0 | MILL | BAKE |
| | "Twain" | | lb/Bu | R | % | R | % | R | % | R | % | R | mm | R | R | | |
| 7748 | SW78-44-111 | MA-9323 | 60.7 | 10 | 11.8 | 9 | 35.2 | 5 | 63.9 | 3 | 10.2 | 9 | 85.0 | 9 | 4 | 27-C | 21-C |
| 7959 | SW78-44-111 | OM-9323 | 59.2 | 9 | 12.6 | 5 | 34.5 | 4 | 61.1 | 3 | 10.8 | 9 | 91.0 | 10 | 6 | 21-D | 25-B |
| 7897 | SW78-44-111 | JM-9323 | 59.9 | 9 | 11.7 | 9 | 21.9 | 3 | 60.9 | 3 | 9.5 | 9 | 90.0 | 10 | 6 | 24-D | 25-B |
| 7315 | SW78-44-111 | BK-9323 | 60.5 | 10 | 12.5 | 7 | 34.7 | 4 | 65.0 | 4 | 9.8 | 9 | 89.0 | 9 | 7 | 25-C | 25-B |
| | AVERAGE | | 60.1 | 10 | 12.2 | 7 | 34.1 | 4 | 62.7 | 3 | 10.1 | 9 | 88.5 | 9 | 6 | 24-D | 24-B |

GRADES: A-EXCELLENT B-GOOD C-ACCEPTABLE D-QUESTIONABLE F-UNACCEPTABLE
R=RATINGS: 9-10=EXCELLENT 8=GOOD 7=ACCEPTABLE 5-6=QUESTIONABLE 1-4=UNACCEPTABLE

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8700033

North American Plant Breeders
SOFT RED WINTER WHEAT QUALITY

YEAR: 1983

OVERALL-LOCATION SUMMARY



| VARIETY OR LINE | CODE | MILLING | | | | | | | | BAKING | | | | | SCORES | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | TEST WT | | WH PROT | | BRK FLR | | TOT FLR | | FL PROT | | C. Diam | | T.G | MILL | BAKE |
| "Twain" | | lb/Bu | R | % | R | % | R | % | R | % | R | mm | R | R | | |
| SW78-44-111 | BI 9322 | 53.9 | 3 | 10.1 | 9 | 38.0 | 6 | 64.1 | 4 | 8.6 | 9 | 93.0 | 10 | 6 | 22-D | 25-B |
| SW78-44-111 | CH 9322 | 57.1 | 7 | 8.2 | 7 | 39.1 | 7 | 63.0 | 3 | 6.7 | 3 | 89.0 | 10 | 5 | 24-D | 18-D |
| SW78-44-111 | PA 9322 | 56.8 | 6 | 9.8 | 9 | 41.0 | 8 | 70.5 | 8 | 8.3 | 9 | 86.5 | 8 | 7 | 31-B | 24-B |
| AVERAGE | | 55.9 | 5 | 9.4 | 9 | 39.4 | 7 | 65.9 | 4 | 7.9 | 7 | 89.5 | 10 | 6 | 25-C | 23-B |
| CALDWELL | BI 9301 | 58.1 | 8 | 10.0 | 9 | 38.1 | 6 | 67.1 | 5 | 8.3 | 9 | 91.5 | 10 | 5 | 28-C | 24-B |
| CALDWELL | CH 9301 | 55.9 | 5 | 8.2 | 7 | 43.2 | 9 | 64.8 | 4 | 6.0 | 3 | 89.0 | 10 | 6 | 25-C | 19-C |
| CALDWELL | PA 9301 | 58.6 | 8 | 8.8 | 9 | 47.3 | 10 | 73.4 | 9 | 7.3 | 5 | 90.0 | 10 | 5 | 36-A | 20-C |
| AVERAGE | | 57.5 | 7 | 9.0 | 9 | 42.9 | 8 | 68.4 | 6 | 7.2 | 5 | 90.2 | 10 | 5 | 30-C | 20-C |
| COKER 916 | BI 9304 | 56.3 | 6 | 10.1 | 9 | 38.1 | 6 | 67.3 | 5 | 8.8 | 9 | 86.5 | 8 | 6 | 26-C | 23-B |
| COKER 916 | CH 9304 | 55.1 | 5 | 8.8 | 9 | 37.2 | 6 | 63.1 | 3 | 7.2 | 5 | 91.5 | 10 | 5 | 23-D | 20-C |
| AVERAGE | | 55.7 | 5 | 9.5 | 9 | 37.7 | 6 | 65.2 | 4 | 8.0 | 9 | 89.0 | 10 | 6 | 24-D | 25-B |

GRADES: A-EXCELLENT B-GOOD C-ACCEPTABLE D-QUESTIONABLE F-UNACCEPTABLE
R=RATINGS: 9-10=EXCELLENT 8=GOOD 7=ACCEPTABLE 5-6=QUESTIONABLE 1-4=UNACCEPTABLE

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87000033

## DISEASE RESISTANCE

### 1986 OH, IN, MS, TN, AR

| | Sept | Leaf Sev. | Rust Res. | Powdery Mildew |
|---|---|---|---|---|
| Lincoln | 6.1 | 2.0 | 5.0 | 0 |
| Twain | 6.8 | 2.5 | 2.0 | 0 |
| Tyler | 6.8 | 8.0 | 5.0 | 0 |
| Caldwell | 6.5 | 3.0 | 3.0 | 0 |
| Hart | 8.0 | 8.0 | 5.0 | 2.5 |

### 1985 OH, AR, IN

| | Sept | Leaf Sev. | Rust Res. | Powdery Mildew | SBMV |
|---|---|---|---|---|---|
| Lincoln | 7.0 | 2.5 | 3.5 | 3.0 | 2.5 |
| Twain | 6.0 | 1.5 | 1.5 | 2.0 | 1.5 |
| Tyler | 6.0 | 6.5 | 5.0 | 1.0 | 3.5 |
| Caldwell | 7.0 | 2.5 | 3.5 | 1.0 | 6.5 |
| Hart | 8.0 | 6.5 | 5.0 | 5.0 | 2.0 |

1-9 Damage scale; 1=Excellent, 9=Poor

BARLEY YELLOW DWARF
PAV ISOLATE

| VARIETY | AVE 1986 | AVE 1985 | $\bar{x}$ | (1984) |
|---|---|---|---|---|
| Lincoln | 6.5 | 5.0 | 5.8 | 7.3 |
| Twain | 6.0 | 6.0 | 6.0 | 5.0 |
| Magnum | 6.2 | 7.2 | 6.7 | 7.0 |
| Hunter | 6.8 | 5.7 | 6.3 | 6.7 |
| Blazer | 5.8 | 7.2 | 6.5 | 5.7 |
| Caldwell | 6.5 | 7.0 | 6.5 | 7.0 |
| Coker 762 | 8.5 | 8.5 | 8.5 | |

1-9 Damage scale; 1=Excellent, 9=Poor

## Rhizoctonia Ratings for Commercial Varieties

| Variety | # Years | a Ave. | Variety | # Years | a Ave. |
|---|---|---|---|---|---|
| Twain | 4 | 3.8 | Roy | 3 | 7.1 |
| Lincoln | 2 | 4.2 | Auburn | 4 | 7.2 |
| Florida 302 | 2 | 4.8 | Becker | 3 | 7.2 |
| McNair 1003 | 4 | 5.1 | Florida 301 | 2 | 7.2 |
| Coker 983 | 2 | 5.4 | Stacey | 2 | 7.3 |
| Coker 762 | 4 | 5.5 | Blazer | 5 | 7.5 |
| Compton | 3 | 5.5 | Coker 797 | 4 | 7.8 |
| Hart | 5 | 5.7 | Pioneer 2550 | 5 | 7.9 |
| Cardinal | 3 | 5.9 | Pioneer 2551 | 3 | 7.9 |
| Hillsdale | 2 | 6.0 | Adena | 4 | 8.0 |
| Saluda | 2 | 6.0 | Coker 747 | 4 | 8.0 |
| Coker 916 | 4 | 6.2 | Magnum | 5 | 8.0 |
| Roland | 5 | 6.3 | Pike | 4 | 8.0 |
| Tyler | 5 | 6.3 | Fillmore | 2 | 8.3 |
| Wheeler | 4 | 6.3 | Doublecrop | 3 | 8.4 |
| Arthur 71 | 5 | 6.7 | Caldwell | 4 | 8.6 |
| Orion | 4 | 6.7 | | | |
| Hunter | 4 | 6.9 | | | |
| Coker 68-15 | 2 | 6.9 | | | |
| Southern Belle | 4 | 6.9 | | | |

1-9 Damage scale; 1 = Excellent, 9 = Poor

SOFT RED WINTER WHEAT TRIAL SUMMARY
OVER LOCATIONS-OVER YEARS
AUGUST 29, 1985

YEARS: 83, 84, 85 No. LOCATIONS: 29

NURSERY TYPE: NAPB, UNIVERSITY, USDA
REGION: DELTA, NORTHERN, SOUTHERN
STATE: AR, IN, OH, IL, MI, MO, SC
WATER MANAGEMENT: CONTINUOUS CROPPING
YIELD LEVEL: ALL YIELD LEVELS

| VARIETY OR LINE | DATA SOURCE | OVERALL YIELD Bu/Ac AP111 | OVERALL YIELD Bu/Ac CK916 | NO. LOC | OVERALL TESTWT lb/Bu AP111 | OVERALL TESTWT lb/Bu CK916 | NO. LOC | 1983 YIELD Bu/Ac AP111 | 1983 YIELD Bu/Ac CK916 | NO. LOC | 1984 YIELD Bu/Ac AP111 | 1984 YIELD Bu/Ac CK916 | NO. LOC | 1985 YIELD Bu/Ac AP111 | 1985 YIELD Bu/Ac CK916 | NO. LOC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A= SW78-44-111 'Twain' | | | | | | | | | | | | | | | | |
| B= COKER 916 | | | | | | | | | | | | | | | | |
| | NAPB | * 69.1 | 62.1 | 17 | 58.8 | 54.6 | 17 | * 69.2 | 57.7 | 6 | * 72.7 | 67.4 | 6 | 64.6 | 60.9 | 5 |
| | UNIV | * 58.8 | 55.5 | 11 | 56.0 | 55.2 | 4 | .0 | .0 | 0 | .0 | .0 | 0 | * 58.8 | 55.5 | 11 |
| | USDA | 69.4 | 71.1 | 1 | 56.3 | 56.2 | 1 | .0 | .0 | 0 | .0 | .0 | 0 | 69.4 | 71.1 | 1 |
| | DELTA | * 57.3 | 56.9 | 11 | 57.1 | 55.3 | 4 | 55.0 | 56.3 | 2 | 68.6 | 70.6 | 1 | * 56.5 | 55.4 | 8 |
| | NORTH | * 70.1 | 61.1 | 17 | 58.6 | 54.6 | 17 | 76.3 | 58.4 | 4 | 73.5 | 66.8 | 5 | * 64.8 | 58.9 | 8 |
| | SOUTH | 69.4 | 71.1 | 1 | 56.3 | 56.2 | 1 | .0 | .0 | 0 | .0 | .0 | 0 | 69.4 | 71.1 | 1 |
| | CON | * 65.2 | 59.9 | 29 | 58.2 | 54.8 | 22 | * 69.2 | 57.7 | 6 | * 72.7 | 67.4 | 6 | * 61.2 | 58.0 | 17 |
| | AR | * 57.3 | 56.9 | 11 | 57.1 | 55.3 | 4 | 55.0 | 56.3 | 2 | 68.6 | 70.6 | 1 | * 56.5 | 55.4 | 8 |
| | IN | * 74.9 | 71.4 | 6 | 58.7 | 57.7 | 6 | 80.6 | 75.2 | 2 | 92.3 | 78.7 | 1 | 65.4 | 68.3 | 3 |
| | OH | 77.6 | 64.2 | 4 | 60.7 | 59.9 | 4 | 72.7 | 62.3 | 1 | 66.4 | 53.1 | 1 | 85.6 | 70.8 | 2 |
| | IL | 75.1 | 47.1 | 2 | 58.0 | 29.4 | 2 | 71.2 | 21.1 | 1 | 79.0 | 73.1 | 1 | .0 | .0 | 0 |
| | MI | 61.0 | 58.9 | 2 | 61.1 | 60.4 | 2 | .0 | .0 | 0 | 56.3 | 54.3 | 1 | 65.6 | 63.6 | 1 |
| | MO | 53.0 | 47.2 | 3 | 54.3 | 54.1 | 3 | .0 | .0 | 0 | 73.7 | 74.6 | 1 | 42.7 | 33.5 | 2 |
| | SC | 69.4 | 71.1 | 1 | 56.3 | 56.2 | 1 | .0 | .0 | 0 | .0 | .0 | 0 | 69.4 | 71.1 | 1 |
| | OVERALL | * 65.2 | 59.9 | 29 | 58.2 | 54.8 | 22 | * 69.2 | 57.7 | 6 | * 72.7 | 67.4 | 6 | * 61.2 | 58.0 | 17 |

*= YIELD OF VARIETY A, IS GREATER THAN VARIETY B, AT 6 OR MORE LOCATIONS.

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SOFT RED WINTER WHEAT TRIAL SUMMARY
OVER LOCATIONS-OVER YEARS
AUGUST 23, 1985

YEARS: 85 No. LOCATIONS: 21

NURSERY TYPE: USDA, UNIVERSITY
REGION: EASTERN, NORTHERN, DELTA, SOUTHERN
STATE: VA, IN, AR, OH, SC, MO, MD, KY
WATER MANAGEMENT: CONTINUOUS CROPPING
YIELD LEVEL: ALL YIELD LEVELS

| VARIETY OR LINE | DATA SOURCE | OVERALL YIELD Bu/Ac AP111 | OVERALL YIELD Bu/Ac SALUD | OVERALL YIELD NO. LOC | OVERALL TESTWT lb/Bu AP111 | OVERALL TESTWT lb/Bu SALUD | OVERALL TESTWT NO. LOC | 1985 YIELD Bu/Ac AP111 | 1985 YIELD Bu/Ac SALUD | 1985 YIELD NO. LOC |
|---|---|---|---|---|---|---|---|---|---|---|
| A= SW78-44-111 'Twain' | | | | | | | | | | |
| B= SALUDA | | | | | | | | | | |
| | USDA | * 68.7 | 65.7 | 13 | 58.6 | 58.7 | 12 | * 68.7 | 65.7 | 13 |
| | UNIV | * 54.1 | 50.0 | 8 | 51.8 | 54.7 | 2 | * 54.1 | 50.0 | 8 |
| | EAST | 61.8 | 63.4 | 2 | 58.2 | 58.3 | 2 | 61.8 | 63.4 | 2 |
| | NORTH | * 73.0 | 62.8 | 8 | 59.4 | 58.8 | 7 | * 73.0 | 62.8 | 8 |
| | DELTA | 56.6 | 57.1 | 7 | 53.4 | 51.7 | 1 | 56.6 | 57.1 | 7 |
| | SOUTH | 55.7 | 56.4 | 4 | 57.2 | 58.5 | 4 | 55.7 | 56.4 | 4 |
| | CON | * 63.1 | 59.7 | 21 | 57.6 | 58.1 | 14 | * 63.1 | 59.7 | 21 |
| | VA | 37.2 | 38.5 | 1 | 59.3 | 59.5 | 1 | 37.2 | 38.5 | 1 |
| | IN | 87.4 | 82.1 | 2 | 62.7 | 62.2 | 1 | 87.4 | 82.1 | 2 |
| | AR | 57.9 | 58.2 | 6 | .0 | .0 | 0 | 57.9 | 58.2 | 6 |
| | OH | 96.7 | 83.5 | 2 | 62.5 | 61.5 | 2 | 96.7 | 83.5 | 2 |
| | SC | 55.7 | 56.4 | 4 | 57.2 | 58.5 | 4 | 55.7 | 56.4 | 4 |
| | MO | 49.0 | 39.0 | 3 | 54.0 | 55.4 | 3 | 49.0 | 39.0 | 3 |
| | MD | 86.3 | 88.2 | 1 | 57.0 | 57.0 | 1 | 86.3 | 88.2 | 1 |
| | KY | 58.7 | 52.6 | 2 | 56.2 | 55.9 | 2 | 58.7 | 52.6 | 2 |
| | OVERALL | * 63.1 | 59.7 | 21 | 57.6 | 58.1 | 14 | * 63.1 | 59.7 | 21 |

*= YIELD OF VARIETY A, IS GREATER THAN VARIETY B, AT 6 OR MORE LOCATIONS.

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